DHD-3 Digital Hand Dynamometer

G-STAR[™] Grip Strength Testing and Research Software

Installation and User Manual





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Addendum A Score Table

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Section 1: Introduction

Although the DHD-3 Digital Hand Dynamometer includes many features when used as stand-alone device, the Grip Strength Testing and Research Software (G-STARTM) extends the DHD-3 capabilities. G-STAR is an easy to use, yet powerful software tool which automates grip strength and endurance testing in both clinical and research environments. All patient information and their test results are stored in an Access[®] database which includes normative score tables for comparison based on age and gender. Maximum grip strength and grip endurance tests are graphically displayed during testing and can be saved in the database with their associated patient information. In addition, tests saved in the DHD-3 itself when used as a stand-alone device, can be imported into the database when re-connected to the PC using G-STAR.

Default values for search functions, sorting sequence, testing mode, unit of measure and other parameters can be set based on preference and common usage, but can be changed for individual tests as required. Voice guidance provides assistance during program operation and helps guide the patient during testing. G-STAR also includes utilities for backing up and restoring the database as well as exporting individual test results to text (.txt) files. The G-STAR database can also be directly accessed to export data into Excel[®] for customized analysis and reporting.

For research applications, selected groups of patients and strength test results from a single database can be combined for analysis and reporting, or separate databases can be used for different groups and research studies. The Average grip strength, Standard Deviation, and Coefficient of Variation are calculated after each test. The research functions display combined test results for individual patients and groups of patients based on a list of search options. All test result screens can be printed for inclusion with patient records and images of test result screens can be easily captured for inclusion in research documentation.

Section 2: Installation

Step 1: Download the current version of the G-STAR^{тм} Software

The current version of G-STAR software can be obtained from <u>www.</u> <u>saehanmedical.com</u>. Under the "Customer Support" tab, click on "Dataroom" and select **DHD-3 G-STAR-SH1003**. Click "Save" to download the compressed installation program **DHD-3 G-STAR (v1.x).zip**.

Step 2: Run the DHD-3 Setup Wizard

Double-click the downloaded **DHD-3 G-STAR (v1.x).zip** file to decompress the file and then double-click on the **DHD-3 G-STAR** file to start the installation program. Click **Next** to continue.



Select the folder for installation of the G-STAR software. This folder is also where the database containing patient, testing, and research information is stored. Click <u>Next</u> to continue.

B DHD-3 G-STAR	×
Select Installation Folder	
The installer will install DHD-3 G-STAR to the following folder.	
To install in this folder, click "Next". To install to a different folder, enter it belo	ow or click "Browse".
Eolder:	
C:\Program Files (x86)\Saehan Medical\DHD-3 G-STAR\	Biowse
	Disk Cost
Install DHD-3 G-STAR for yourself, or for anyone who uses this computer:	
⊚ Just <u>m</u> e	
Cancel < <u>B</u> ack	Next >

Click **Next** to continue with the installation of the software and database.

谩 DHD-3 G-STAR	×
Confirm Installation	
The installer is ready to install DHD-3 G-STAR on your computer.	
Click "Next" to start the installation.	
Cancel < Back	Next >

G-STARTM - Installation

The progress bar indicates files are being installed.

岗 DHD-3 G-STAR	x
Installing DHD-3 G-STAR	
DHD-3 G-STAR is being installed.	
Please wait	
Cancel < Back	<u>N</u> ext>

Click **Close** to complete the G-STAR software installation.

谩 DHD-3 G-STAR	x
Installation Complete	
DHD-3 G-STAR has been successfully installed.	
Click "Close" to exit.	
Cancel < Bac	k Close

Step 3: Installation of the USB Virtual Com Port Driver

The USB Virtual COM port driver can be obtained from <u>www.saehanmedical.</u> <u>com</u>. Under the "Customer Support" tab, click on "Dataroom" and select **DHD-3 G-STAR-SH1003**. Click "Save" to download the **VCPDriver v1.3.1.zip**.

Run VCP_V1.3.1_Setup.exe. The setup program will install the USB Virtual COM Port software and provide instructions when to connect the DHD-3 using the USB cable.

Step 4: Linking the DHD-3 with the G-STAR software

Connect the DHD-3 to the PC using the USB cable and press the **PWR** button to turn on the device. Click on the desktop icon at to run the G-STAR software which should automatically establish a link with the DHD-3.

Link ON is displayed in the lower left corner of the screen when the link is successful.



If **Link Off** is displayed and the error message "**No Device**" appears, then follow the instructions in Step 5 and Step 6 for identifying and setting the USB COM Port number in G-STAR.

STEP 5: Identify the COM Port number assigned by Windows

The COM port number will be uniquely assigned to your PC by Windows. To learn which Virtual USB COM Port number was assigned by Windows during installation, follow the instructions below for your version of Windows, then proceed to Step 6.

For Windows XP

Connect the DHD-3 using the USB cable and press the **PWR** button to turn on the device. Go to the **Start Menu** and select **Control Panel** \rightarrow **System**, click on the **Hardware** tab and then click **Device Manager**.

System Properties					
System	Restore Automatic Updates	Remote			
General	Computer Name Hardware	Advanced			
⊂ Device M	lanager				
Ň	The Device Manager lists all the hardware devices on your computer. Use the Device Manager to char properties of any device.	installed nge the			
	Device Mana	nager			
Drivers					
	Driver Signing lets you make sure that installed drive compatible with Windows. Windows Update lets you how Windows connects to Windows Update for driv	ers are u set up vers.			
[] [Driver Signing Windows Upo	iate			
Hardware	e Profiles				
R	Hardware profiles provide a way for you to set up an different hardware configurations.	nd store			
	Hardware Pro	ofiles			
	OK Cancel	Apply			

Expand the list of **Ports (COM & LPT)** by clicking on the '+" sign. The (**COM**#) next to "STMicroelectronics Virtual COM Port" is the COM Port number Windows XP has assigned for the DHD-3. Make note of the COM#, and then close the Device Manager and Control Panel windows.



For Windows Vista and Windows 7

Connect the DHD-3 using the USB cable and press the **PWR** button to turn on the device. Go to the **Start Menu** \rightarrow **Devices and Printers**. The (**COM**#) next to "STMicroelectronics Virtual COM Port is the COM Port number Windows Vista or Windows 7 has assigned for the DHD-3. Make note of the COM#, and then close the Devices and Printers window.



STEP 6: Setting the COM Port Number in G-STAR

With the DHD-3 connected and powered on, start G-STAR. Click the **Device** icon on the toolbar.

🕘 DHD-	3 G-STAR [ver 1.1]	saehan d	igital Hand Dynamometer	
File Pa	tient Consultation	Option	Help	
: 6	≝ 28 ₽			
Devic	ce			

Select the COM Port number identified in Step 5 to link successfully with the DHD-3. Click **OK** to continue.

Windows XP Example

Windows Vista/Windows 7 Example

Device
Device
Hand Dynamometer

The following message will appear when the DHD-3 Digital Hand Dynamometer is successfully linked with the G-STAR software. Click **OK** to begin using the program.

DHD-3	×
Â	Device Connected !!!!
	ОК

To permanently save the selected COM Port number in G-STAR, disconnect the USB cable and select the correct COM Port number again as described above. Then click **OK**. Since the DHD-3 is disconnected, the following message will be displayed, but the COM port number will be saved to the G-STAR configuration file (TMK-EDM) and become the default COM Port number. Each time the DHD-3 is connected, it will link automatically for G-STAR testing and will display stand-alone test results stored in DHD-3 memory for importing into the G-STAR database.

DHD-3	×
Â	No Device Port !!!!
	ОК

Section 3: Menu and Toolbar Commands

All features of the G-STAR software can be accessed by selecting one of the five menu items across the top of the screen and then selecting from the list of pull-down functions. The most common functions are also included on the Toolbar enabling quick access to the desired feature.

File Menu

0	DHD-3 G-S	TAR [ver 1.1] S	AEHAN D	igital Hand Dynamometer	
File	Patient	Consultation	Option	Help	Ĩ
3	Backup				
0	Restore				
₽	Exit				
_					

Backup Creates a backup copy of the database using the date as the filename
 Restore Replaces current database with a previous backup copy of the database
 Exit Exits the program

Patient Menu

DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer			
File	Patient Consultation Opt	ion Help	
. *	Registration		
	List of Patients		

- Registration
- List of Patients

Add, edit, delete, and search patient file information List selected patient information and their test dates

Toolbar Icon

DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer				
File	Patient	Consultation	Option	Help
. *=		2 P		
	Registr	ation		

Consultation Menu

DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer				
File Patient	Consultation Option	Help		
6 .	🗟 Testing			
	List of Test			

Toolbar Icons

) D	HD-3 (6-S	TAR [v	er 1.1]	SAEHAN	Digi	tal Ha	nd D	ynam	omete	r
File	Patie	nt	Cons	ultation	n Optio	n ⊦	Help				
"J]		1	¥ 8								
			Tes	ting							
DI	HD-3 G	6-S'	TAR [v	er 1.1]	SAEHAN	Digit	tal Har	nd Dy	/nam(omete	
Di File	HD-3 G Patier	6-S" ht	TAR [v Cons	er 1.1) ultatior	SAEHAN Optic	Digit n H	tal Har Ielp	nd Dy	/nam(omete	
Di File	HD-3 G Patier	G-S' nt	TAR [v Cons	er 1.1] ultatior	SAEHAN Optio	Digit n H	tal Har Ielp	nd Dy	/nam(omete	

- Testing
- List of Test
- Research

Maximum Strength Testing and Endurance Testing Displays individual test results for selected patients Calculates and displays results for selected groups of patients and tests

Option Menu

🛞 DHD-3 G-STAR [ver 1.1] S/	AEHAN Digital Hand Dynamometer
File Patient Consultation	Option Help
14 8 8 8 9	🖆 Device
	i Setting Data
	Score Table

Toolbar Icons

File	Patient	Consultation	Option	Help
		2 P		
ſ	Device			
1 9				
		TAD 5		
	HD-3 G-S	TAR [ver 1.1] S/	AEHAN D	igital Hand Dynamome
File	0HD-3 G-S Patient	TAR [ver 1.1] S Consultation	AEHAN D Option	igital Hand Dynamome Help
File	HD-3 G-S Patient	TAR [ver 1.1] S/ Consultation 월 <i>우</i>	AEHAN D Option	igital Hand Dynamome Help
File	HD-3 G-S Patient	TAR [ver 1.1] S, Consultation	AEHAN D Option	igital Hand Dynamome Help

• Device	e
----------	---

- Setting Data
- Score Table

Selects COM Port for linking with DHD-3 Digital Hand Dynamometer Set default values for searching, testing and displaying results Normative grip strength data for comparison during strength testing *

* For more information, see Appendix A: Score Table

Help Menu

File	Patien	t C	onsultation	Option	He	P	
á			P		?	About DHD-3 G-STAR	
					1	Saehan Medical on the Web	

- About DHD-3 G-STAR
- Saehan Medical on the Web

Displays G-STAR software version Link to www.saehanmedical.com

Section 4: Backing Up and Restoring the Database

Before using G-STAR, it is important to understand where the database and supporting files are located, and to verify full access to the database. The database, program files, and database backup files are located in the program folder selected during installation (*Program Files\Saehan Medical\DHD-3 G-STAR*).

Creating a Backup of the Current Database

To save a copy of the current database, select $File \rightarrow Backup$

) DI	HD-3 G-S	TAR [ver 1.1	.] SAE	HAN Di	gital Har	nd Dynai	momete	r
File	Patient	Consultati	on	Option	Help			
2	Backup							
Ô	Restore	1						
P	Exit							
-								

Choose a unique file name to save a backup copy of the current database (NX_DSN). G-STAR can save a copy as "Backup" automatically when exiting G-STAR (see Section 5 : Setting Data Default Values).

organize + New	ionaer			8=	
🚖 Favorites	<u> </u>	Name	Date modified	Туре	Size
	- 11	Endurance	3/19/2012 8:11 PM	File folder	
Desktop	E	Sound	3/19/2012 8:11 PM	File folder	
Libraries		20120226	3/19/2012 9:39 PM	Microsoft Access	3,264 8
Documents		Backup	3/19/2012 9:39 PM	Microsoft Access	3,264
👌 Music		MK_DSN	3/19/2012 9:39 PM	Microsoft Access	3,254
E Pictures					
Videos					
🖏 Homegroup	-	< [
File name: 2	0120226				
Save as type:	ccess DB Fi	les			
Save as type: [A	CCESS UB PI	les			

Restoring a Backup Copy of the Database

To restore a previous copy of the database, select $File \rightarrow Restore$

🕘 DHD-3 G	-STAR [ver 1.1] S	aehan d	Digital Hand Dynamometer
File Patier	nt Consultation	Option	Help
🦃 Backup			
© Restore			
🖗 Exit			

Click **OK** on the warning message.



Select the file name of a previous backup to restore as the current database or select the file name "Backup" to restore the most recent copy of the database if **Backup Copy on Exit** was set to "Yes" in the Setting Data screen. G-STAR uses "NX_DSN" as the current database. Click **Open** to restore the selected backup copy of the database and begin using as the current database.

Open		(and a			×
OO K Program	n Files (x86) ► Saehan Medical ►	DHD-3 G-STAR +	Search DHD-3	G-STAR	ρ
Organize New fol	der			# • 🗇	0
🚖 Favorites	Name	Date modified	Туре	Size	
Desktop	Endurance	3/19/2012 8:11 PM	File folder		
Downloads	Sound	3/19/2012 8:11 PM	File folder		
🖳 Recent Places 🗏	20120320	3/19/2012 9:39 PM	Microsoft Access	3,264 KB	
	Backup	3/19/2012 9:39 PM	Microsoft Access	3,264 KB	
E Desktop	A NX_DSN	3/19/2012 9:39 PM	Microsoft Access	3,264 KB	
词 Libraries	_				
Documents					
Music					
Pictures					
😸 Videos					
🖏 Homegroup 🖕					
			A DD Film		
rile	Danie SATSA25A		+ Access Db Files		-
			Open 🔻	Cancel	

Note: If you select **Cancel**, G-STAR has already disabled access to the current database in preparation to replace it with a backup copy. Simply exit and restart G-STAR to re-enable access to the current database again.

Section 5: Setting Data Default Values

Setting Data is used to modify and save default values for common usage during testing and when displaying patient information and test results. Some of the values can be set during testing to different settings as needed, but are not saved as default values for future testing.

To modify and save default values, select **Option** \rightarrow **Setting Data** or click the **Setting Data** toolbar icon.

DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer	DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer
File Patient Consultation Option Help	File Patient Consultation Option Help
출 🗐 🛎 월 🖉 🎽 Device	名 🗐 🖻 🖉 🖉
🦉 Setting Data	Setting Data
Score Table	

Select and change the default values as desired, then click Apply and OK.

oment	ALLER O		
	Setting Data		
Set Unit of Measure	Strength Testing	Endurance Testing	
UOM (b or Kg)	 Left-Right, Left-Right, Left-Right Right-Left, Right-Left, Right-Left 	Min.Grip Force 10	
Printing unit Kg v Print preview No v	 Left-Left-Left, Right-Right Right-Right-Right, Left-Left 	Unit of Measure Ib 🔻	
Set Automation and Recognition	Voice and Device	Display Defaults	
Backup Copy on Exit Yes 👻	Voice Assistance Yes	Sort Sequence Code 💌	
Auto Age Calculation Yes 💌	Default Device Hand Dynamom	Date Range All date 👻	
Recognition Delay (sec) 5 ×	Sat Unite to kn Sat Unite to lb		
	Seconds to kg Seconds to ib	Apply OK Cancel	

G-STARTM - Setting Data Default Values

• UOM (lb or Kg)	Selects the preferred unit of measure for testing and display
 Printing unit 	Cannot be changed - printing is based on UOM
Print preview	Disabled – prints screen image directly to default printer
 Backup Copy on Exit (Saves to Copies) 	Saves the current database to "Backup" when exiting G-STAR
Auto Age Calculation	Disabled – all calculations use age at time of registration
Recognition Delay	Delay in seconds for prompts to switch hands during testing
Recognition Weight	Minimum grip force required to start recording strength testing
Strength Testing	Sets hand switching sequence for strength testing (3 per hand)
Voice Assistance	Sets voice assistance and testing prompts on or off
• Default Device	Only DHD-3 Digital Hand Dynamometer is available
• Set Units to kg/lb	Sets UOM and Unit of Measure for both test modes
• Min. Grip Force	Sets the minimum grip force required for endurance testing
• Unit of Measure	Selects either lb. or kg for endurance testing
Sort Sequence	Selects sort sequence for displaying lists of patients and tests
• Default Range	Selects default registration date range in search functions

Section 6: Patient Registration

Patient Registration is used to add, edit, and delete patient information. New patients are automatically assigned a unique Code based on the year and month when first registered combined with a two-digit number incremented from 00-99. Existing patient information can be retrieved by their Code or by searching on a combination of their name, phone number, and remarks.

To access the Patient Registration screen, select **Patient** \rightarrow **Registration**, or click the **Registration** toolbar icon.

Adding New Patient Information

DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer	DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer
File Patient Consultation Option Help	File Patient Consultation Option Help
E Registration	
List of Patients	Registration

Select **New** to automatically generate the next unique patient Code and then enter the patient's information on the right side of the screen. Name, Age, Gender, and Handedness are required for comparison of strength test results with normative data in the Score Table and to group patients when using G-STAR for research studies. Click **Save** to add the new patient information to the database.

		Registration					Sava	Delete	Search Close
Sart Code	• Cos	•		Name		Phone	Rat	wrks	
Dode	None	Age	Gender	Occupation	Phone				
							MM-CD-YYYYY		
						Register	03-20-2012		
						Code	2012030005		
						Name	Nancy Gordon		
						Age	45		
						Gender	Penale	•	
						Handednes	s Right	•	
						Occupeti	on Teacher		
						_			
						Phone	510-972-1535		
						Address	1021 Central Ave	nue -	
							Palin Springs, CA	92262	

Editing Patient Information

To modify an existing patient's information, enter their Code and click the **Search** button. You can also enter any combination of their Name, Phone number, and Remarks and then click **Search** to display matching results. To sort the matched results in a different sort sequence, select the **Sort** option and click on **Search** again. Select a specific patient from the list on the left side of the screen and edit the highlighted patient's information on the right side of the screen. Click **Save** to update changes to the database or **Close** to close the Registration screen without updating changes to the database.

			Re	gistration			New	Save	Delete	Search	Close
Sort Nare	t • Code			Name		Phone			Remarks		
Code	None	Age	Gender	Occupation	Phone						
012030003	John Snith Karen Johnson	35 41	Male Fenale	Real Estate Agent	714-555-1234 949-554-1901			MH-00-YYY	rr		
012030005	Nancy Gordon Sen Jones	45	Female Male	Teacher	510-972-1535 714-222-6799		Register	02-15-2012	2		
							Code	201201000	1		
								at a suit			
							Are	30		41	
							Gender	Maia			
							Handedness	Right		•	
							Occupation	Firenan			
							Phone	714-785-29	45		
							Address	326 Red Hill			
								Tustin, CA 9	92790		
							Remarks				

Deleting Patient Information

To delete patient information and all their saved test results from the database, select the specific patient as described above so their information is displayed on the right side of the screen. Click Delete to delete the patient information from the database and then click **Yes** to confirm the deletion.

Are you sure?
Are you sure?
Yes <u>N</u> o

Listing Patient Information

List of Patients is used to search for patients and view a summary of their saved test results. The list of patients is based on the search criteria and can be saved in a text file for printing and exporting to other programs.

To access the List of Patients screen, select Patient \rightarrow List of Patients.



To display an existing patient's information and view a list of their previous test visits, enter their Code and click **Search**. You can also enter any combination of date range when registered, Name, and Phone number and then click **Search** to display matching results. To display the matching results in a different sort sequence, select the **Sort** option and click **Search** again. Highlight a specific patient from the list to view their previous test dates in the lower part of the screen.

To begin testing a specific patient in the list, highlight their patient information without closing the List of Patients screen, and then select **Consultation** \rightarrow **Testing** or click the **Testing** toolbar icon.

					List of	Patients	Search	n ToText Oose
Register 1/	00-1111 ¥ ~	ИМ-DD-11111 3/31/2012	×	Code	Na	ne	Phone	Sort Name
					List of Patients			Record: 5
Code	Name	Ape	Gender	Handedness	Occupation	Phone	Address 1	Address 2
2012030003	John Snith	35	Male	Left	Engineer	714-555-1234	123 Main Street	Santa Ana, CA 92205
0012020002	Karen Johnson	41	Penale	Flight	Real Estate Agent	949-554-2901	753 Rhver Road	Newport Beach, CA 928
2012030001	Nark Williams	38	Nale	Right	Firenan	714-785-2943	326 Red Hill	Tustin, CA 92780
012030005	Nancy Gordon	45	Penale	Right	Teacher	510-972-1535	3021 Central Avenue	Pain Springs, CA 9226
2012030004	San Jones	25	Male	Flight	Electrician	714-222-6789	15 Oak Street	Costa Nesa, CA 92626
					List of Visits			
Date	Time	Mode	5	evice P	tande			Ren
02-15-2012	11/03	Strengt	1	HD	2 Pos			
02-22-2012	13:15	Strengti	1	HD	2 Pas			
03-08-2012	11:35	Endurance	e	HD	2 Pos			

Section 7: Grip Strength Testing

The G-STAR software automates the Rapid Exchange Testing process. The process consists of selecting a registered patient for testing, administering the strength test, and reviewing the test results. Strength testing is performed in six steps by testing each hand three times hands in the sequence established in the Setting Data screen. This method provides an accurate measurement of maximum grip strength for each hand.

Upon completion of the strength test, the Average grip force, Standard Deviation (SD), and Coefficient of Variation (CV) are calculated and displayed for each hand. Strength test results are also compared with normative data in the Score Table based on the patient's gender, age and dominant hand. Saved test results can be used to measure patient progress during rehabilitation and can be included in specific groups for research studies.

To begin the maximum grip strength testing process, select Consultation \rightarrow Testing or click on the Testing toolbar icon.

DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer	DHD-3 G-STAR [ver 1.1] SAEHAN Digital Hand Dynamometer
File Patient Consultation Option Help	File Patient Consultation Option Help
🖆 🗐 🖉 🖉 Testing	14 II II II P
E List of Test	Testing
A Research	

Selecting the Patient

The **Select Mode** screen is used to select a registered patient and test mode setting. The patient information will appear if previously highlighted on the **List of Patients** screen as previously described.

Select Change Patient to view and select from a list of registered patients.

DHD-3 G-STAR (ver File Patient Comul S III # 2 P Save 2mage	1.1] SAEHAN Digital H	and Dynamometer	Te	sting		U	Com *
	Date of test Time of test Code Name Age /Hand Gender	Palsent Met20-YYYY 3(20)2012 11:06 Ohange Pater	2	Mes 5 Device Handle	Texting Mo Inrigh Text O Interd Dynamoter Position 2	de Endurance Test	r
Select Mode	Patient Test Consults	alion		н		[Next

The patient can be selected by entering their Code or a combination of Name and Phone number; then click **Search** to display matching results. Highlight the patient to be tested, and click **OK**.

ect									
Select Patient									
Code	Code		Name		Phone		Search		
Code	Name	Age	Gender	Handedness	Occupation	Phone			
2012010001	Mark Williams	38	Male	Right	Fireman	714-786-2943			
2012020002	Karen John	41	Female	Right	Real Estate Agent	949-554-1901			
2012030003	John Smith	35	Male	Left	Engineer	714-555-1234			
2012030004	Sam Jones	25	Male	Right	Electrician	714-222-6789			
C									
						ОК	Cancel		

Select Max Strength Test and then click Next to continue to the Patient Test screen.

Note: The normative data in the Score Table is based on Handle Position 2.

		resting			Lint b
	Patient		Tes	ting Mode	
Date of test	3/20/2012	1 *	() Nex Strength Test	Endurance Test	
Time of text	11:07		Print Frank		
Code	2012030004		Lievice [Hand Dynamo	reter ·	
Name	San Jones		Handle Position 2	•	
Age / Hend	25 / Right				
Gender	Male				
	Change Patient				
					Next

Strength Testing

Instruct the patient to exert maximum grip force during the three tests of each hand using the sequence graphically displayed from left to right as Step 1 through Step 6, and the prompting by the optional voice assistance. The horizontal red lines indicate the normative range for the patient based on gender, age, and dominant hand.

we thege		Strengtl	n Testing		Print Close
a bi					
	Left Hand			Right Hand	
			150		
0			100		
0			140		
10			120		
20					
50			60		
a			40		
α			20		
1	2 3	Average	1	2 3	Average
0.0000	CV 0.00	00	SD 0.0000	CV 0.4	0000
Shap 1	Step 2	Step 3	Stap 4	Step 5	Step 6
5	(E)	5	E	5	(E)
		4			
				Back	Next

During testing, the grip force is displayed for each hand. The following commands are available:

- **Retry** Restart the test for this patient
- Save Image Capture and save an image of the screen
- **Print** Print an image of the screen to the default printer
- Close Close the screen without saving
- Back Return to the Select Mode screen
- Next Continue to the Consultation screen



Reviewing Results

The Consultation screen displays detail information about the patient, test mode settings, and grip strength test results including an area to enter remarks about the test. The Average grip force, Standard Deviation (SD), and Coefficient of Variation (CV) are calculated and displayed for each hand as well as the difference between the averages of each hand. The following commands are available:

- Save Image Capture and save an image of the screen
- **Print** Print an image of the screen to the default printer
- Close Close the screen without saving
- Back Return to the Patient Test screen
- Save Saves test information in the database and close the screen

Save Image				Resul	t of T	esting						Print	Close
		_						_					Unit: Ib
P	atient Information	_		Lef	t Hand					5	ight Hand		
Uate Code	201202012 11:09							_					
Lode	2012030004												
Name	sen Jones	100						100					
rige (Hand	and y regen	140						140					
Gender	Pas	100						100	121	2 124.2	120.1		121.8
	Text Mode	100	112.1	107.8	114.0		5	100					
Mode	Strength Test	00						- 00					
Device	Hand Dynamometer												
fin. Grip Force	N	60						00					
Delay Step	N							20					
	Decut							0					
Lefting	111.SIb [Average]		1	2	3	Aut	10e	1	1	2	3		Average
Right Hand	121.8 b [Average]												
Difference	10.41b [Max-Min]	90	2.7716		CV	2.4955		50	1.7326		CV.	1.4221	
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Section 8: Endurance Testing

Endurance testing is a method to measure both the amount of grip force a patient can maintain and the length of time the patient can exert grip force above the minimum setting. Grip strength and endurance can be improved by systematically increasing the minimum grip force and endurance time during therapy. G-STAR is an ideal tool to for use in therapy and to accurately measure patient progress and response to therapeutic treatment.

Initially, measure the patient's maximum grip strength using Grip Strength Testing to determine the minimum grip force to be maintained during Endurance Testing. For example, start with 50% of the average maximum grip strength as the minimum grip force setting and to measure the amount of time the patient can continuously maintain their grip above the minimum grip force setting. As the patient's endurance time increases, the minimum grip force setting can be gradually raised.

To begin the endurance testing process, select **Consultation** \rightarrow **Testing** or click on the **Testing** toolbar icon.

🕘 DHD-3 G-S	TAR [ver 1.1] SAEHAN Digital Hand Dynamometer	🛞 DHD-3 G-STAR [ver 1.1] SAEHAN Digital
File Patient	Consultation Option Help	File Patient Consultation Option Hel
5 B 🖉	월 Testing	1 in
	E List of Test	Testing

and Dynamometer

Selecting the Patient

The **Select Mode** screen is used to select the patient and the test mode. The patient information will appear if previously highlighted on the **List of Patient** screen as previously described.

Select Change Patient to view and select from a list of registered patients.

■ Patient Consi = Patient Consi = 등 # 월 P	ultation Option Help	and bynamorrezer						
Save Image				Testing			00	k .
_							Unit: Ib	
		Patient]	Te	sting Mode		
		MM-DD-11111						
	Date of test	3/20/2012	8*		Max Strength Test	(i) Endurance Test		
	Time of test	12/34					-	
	~				Device Hand Dynami	neter *		
	Code				Handle Destrice 3			
	Nane				Pusionz	•		
	Age / Hand				Min. Grip Porce	20 👘 Units	b	
	Gender							
		Change Pati	ert					
							Piest	
Select Node	Patient Test Consults	tion						
inis ON								

The patient can be selected by entering their Code or a combination of Name and Phone number, then click **Search** to display matching results. Highlight the patient to be tested, and click **OK**.

				Select	Patient			
Code			Name		Phone	Search		
Code	Name	Age	Gender	Handedness	Occupation	Phone		
012010001	Mark Williams	38	Male	Right	Fireman	714-786-2943		
012020002	Karen John	41	Female	Right	Real Estate Agent	949-554-1901		
012030003	John Smith	35	Male	Left	Engineer	714-555-1234		
012030004	Sam Jones	25	Male	Right	Electrician	714-222-6789		
012030005	Nancy Gordon	45	Female	Right	Teacher	510-972-1535		
_								

Select **Endurance Test** and set the **Min. Grip Force** to be maintained during testing. Click **Next** to continue to the Patient Test screen.

ा में थे P Save image			Tes	ting			Oose
		Patient			Testi	ng Mode]
	Date of test	3/20/2012	D*	(7) May 9	kepsth Test	(i) Park surgery Tant	
	Time of test	12:34		0.000	iogin car	S. C. S. S. S. F. S.	
	Code	2012030003		Device	Hand Dynamone	tior 💌	
	Nane	John Snith		Handle	Position 2	*	
	Age / Hand	35/Left		Min	Grip Force	50 🖆 Linh Ib	
	Gender	Male				1 1	
		Change Patient	1				
							Fiest
	· · · · ·	_				1	

Endurance Testing

Instruct the patient to begin with the DHD-3 in their left hand and to maintain grip force above the horizontal red line for as long as possible or until instructed to stop. During testing, the grip force will be graphically displayed as a blue line once grip force is applied and a preset 200ms delay. Although the vertical timing marks will continuously scroll across the bottom from right to left, endurance hold time is calculated only during the time minimum grip force is maintained. During testing, both the grip force and timing marks scale to fit the display.

The horizontal red line indicates 50 lbs. is set as the minimum grip force setting.

	Endurance Testing
Dette Ball	
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т	3
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Endurance testing always begins with the left hand and continues until grip force falls below the red Minimum Grip Force line. Select **Swap** and follow the voice assistance prompt to begin testing right hand endurance.

oge	Endurance Testing	Print Ci
nt: b		
L 72		
E 03		
F		
T 25		
9		
R 40		

The following commands are available:

- **Retry** Restart the endurance test for the selected hand
- Swap
- Start endurance test for the other hand
- Save Image Capture and save an image of the screen
- **Print** Print an image of the screen to the default printer
- Close Close the screen without saving
- Back Return to the Select Mode screen
- Next Continue to the Consultation screen



Reviewing Results

The **Consultation** screen displays detail information about the patient, test mode settings, and endurance test results including an area to enter remarks about the test. The duration of time grip force was maintained above the minimum grip force is calculated and displayed for each hand as well as the difference in duration of time between hands. The following commands are available:

- Back Return to the Patient Test screen
- Save Image Capture and save an image of the screen
- **Print** Print an image of the screen to the default printer
- Close Close the screen without saving
- Save Save test information in the database and close the screen

Save Image			Result of Testing	Print Gose
			Recent of Feeting	unc bi
	Patient Information			
Date	03-20-2012 12:58			
Code	2012030003	L .		
Name	John Snith	E .	54	
Age / Hand	35 / Left	F	8	i long
Gender	Male	T	27	
			9 bad	5ec
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An. Grip Porce	90.0			
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Left Hand	9.60 [Hold Seconds]	т .	27	
Right Hand	12.60 [Hold Seconds]		• <u></u> /++++++++++++	
Difference	3.00 [Hold Seconds]		1 2 3 4 8 8 7 8 8 10 11 1	12 13 14 16 18 17
			Remarka	
				Red Sea
				Back Sava

Section 9: Listing Test Results

List of Test is used to display a list of saved tests based on the search criteria. By highlighting a specific test from the list, individual test results are graphically displayed. The list of tests including test results can be saved in a text file for printing and exporting to other programs if desired.

To access the List of Test screen, select Consultation \rightarrow List of Test.

💮 DHD-3 G-S	TAR [ver 1.1] SAEHAN Digital Hand Dynamo	meter
File Patient	Consultation Option Help	
1 1 1	 ⅔ Testing ☑ List of Test 	

To display the list of tests, enter a combination of the date range when patients were registered and the testing Mode, then click **Search** to display matching results. You can also display tests based on patient Code, Name, and Phone number using the patient search function. To display the matching results in a different sort sequence, click on the column headers.

Save Inage			List of	Test				Search Delete Print To Text C						
legister 1/	1/2011	MM-51	0-11111 (2012 • Ma	de Al	•	Device Hand	Cynamometz 🔹	Handa Al	• Pater	nt				
						Test List afb	er Search							
Date	Time	Code	Nane	Gender	Age	Handedness	Mode	Device	Handle	Min. Grip Force	DelayStep			
2-15-2012	11:03	2012030001	Mark Williams	Male	38	Right	Strength	HD	2 Pas	0.00	D			
2-21-2012	09109	2012020002	Karen Johnson	Fenale	41	Right	Strength	HD	2 Pos	0.00	0	1		
2-22-2012	13:15	2012010001	Mark Williams	Male	38	Right	Strength	HD	2 Pas	0.00	D			
3-03-2012	13:50	2012030004	San Jones	Male	25	Fight	Strength	HD	2 Pos	0.00	0			
3-05-2012	11:35	2012030001	Mark Williams	Plate	38	Faght	Endurance	HD	2 Pas	10.00	200			
2408-2012	US II	2012030303	Jorn Swith	11	35	uert	50 En 001	HO	21905	0.00	0	ĸ		
16 14 12 10 6 4 2							16 14 12 19 5 4 2							
۰	1	2	3	Aa	erage			1	2 3	:	Average			

The following commands are available:

- Save Image Capture and save an image of the screen
- **Delete** Delete the highlighted test result
- **Print** Print an image of the screen to the default printer
- **To Text** Save the highlighted test result to a text file (.txt)
- Close Close the screen without saving

To graphically display a Strength Test from the list of tests, select a specific test by highlighting the row of information.



To graphically display an Endurance Test from the list of tests, select a specific test by highlighting the row of information.



Section 10: Research Using the G-STAR Database

Research is used to display a list of patients with one or more strength tests saved in the database based on search criteria for a specific group of patients. The combined results of the group are graphically displayed in addition to the combined Average grip strength, Standard Deviation, and Coefficient of Variation calculations for the group. By highlighting a specific patient within the group list, only the combined results of all strength tests for the patient are displayed.

To access the Research screen, select Consultation \rightarrow Research or click on the **Research** toolbar icon.



To display a list of patients included in a research group, enter any combination of the date range when patients were registered, Age range, Gender, and dominant Hand, then click **Search** to display the list of patients matching the search criteria. To display the list of patients in a different sort sequence, click on the column headers.

ave Eneg M	HID-11111	MM-2D-11111			Re	search		Search Print	Close
poter 1	1/2011 •	~ 3/31/2012	• Node	Strength	• Devis	Hand Dynamom 🔻	Age 1 1 ~ 150 1 Ge	nder Male • Har	ৰ জিলা -
		Left Han	d		Unit		Right Han	i	Unit
						24			
						21			
						18			
						12			
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	+	2 3			Average		1 2 3	A	erage
,			EV.					EV.	
					5	earch List			
Code	Register	Name	Gender	Ape	Handedness		Remarks		

The following commands are available:

- Save Image Capture and save an image of the screen
- **Print** Print an image of the screen to the default printer
- Close Close the screen without saving

The combined results of the group are displayed graphically as well as the combined Average grip strength, Standard Deviation, and Coefficient of Variation calculations for the group.



By highlighting a specific patient within the group, the combined results of all strength tests for the patient are displayed.



Section 11: Importing Stand-Alone Tests from the DHD-3

Stand-alone tests from a patient performed when the DHD-3 is not connected can be imported into the G-STAR database the next time the DHD-3 is reconnected. Up to three strength test results for each hand saved in the DHD-3 memory for an individual patient in Testing Mode and/or Auto Mode can be selected and imported for a patient previously registered in G-STAR. Stand-alone tests should be imported on the same day since G-Start saves the tests based on the import date. Refer to the DHD-3 Digital Hand Dynamometer User Manual for more information on using the DHD-3 as a stand-alone device.

STEP 1: Displaying Stand-alone Test Results Saved in the DHD-3

As soon as the DHD-3 is reconnected to G-STAR, the list of saved test results in the DHD-3 memory is displayed. In this example, both Testing and Auto Mode stand-alone tests have been saved in the DHD-3 memory.

					- (<u>-</u> - ,			.,						
		List of Tes	ts in Device	Mem	ory						Selec	ted Tests			
w	Hand	Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Time	Unit	Max	Min.	Srip For
Ē	Left	04-19-2012	16:03:12	lb	115.7		22								
2	Left	04-19-2012	16:03:21	lb.	102.2										
5	Left	04-19-2012	15:03:27	b	105.4										
	Right	04-19-2012	16:02:39	lb.	112.3		~~								
2	Right	04-19-2012	16:02:48	lb.	117.8										
5	Right	04-19-2012	15:02:39	b	121.0										
	Left Auto	04-19-2012	16:03:11	Ъ	101.4			•							
	Left Auto	04-19-2012	16:03:21	lb.	98.2										
	Left Auto	04-19-2012	16:03:32	b	96.4							Л.,			
	Right Auto	04-19-2012	16:03:16	Ъ	101.3						-	1			
2	Right Auto	04-19-2012	16:03:27	lb.	123.0			_							
3	Right Auto	04-19-2012	16:03:37	b	99.3						Patient	Informatio	n		
									Co	le					
									Nor	re l					
									Ger	ider (
									Age						
6						,						Selec	Patient)	
1															
							Dee	marks -					6.	was to D	2

Test results can be chosen individually or in groups by using the **SHIFT** key or the **CTRL** key when choosing the tests to be imported.

		List of Test	ts in Device	Merr	ony						Selec	ted Tests		
ю	Hand	Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Tine	Unit	Max	Min. Grip Ford
	Left	04-19-2012	16:03:12	Ь	115.7									
	Left	04-19-2012	16:03:21	Ь	102.2									
	Left	04-19-2012	16:03:27		105.4									
	Right	04-19-2012	16:02:39		112.3		~~							
	Right	04-19-2012	16:02:48	lb	117.8									
	Right	04-19-2012	16:02:59	Ib	121.0									
	Left Auto	04-19-2012	16:03:11	lb	101.4			4						_
2	Left Auto	04-19-2012	16:03:21	lb	95.Z									
3	Left Auto	04-19-2012	16:03:32	lb	95.4							л.,		
L	Right Auto	04-19-2012	16:03:16	lb	101.3							1		
2	Right Auto	04-19-2012	16:03:27	lb	123.0			_						
3	Right Auto	04-19-2012	16:03:37	lb	99.3						Patient	Informatic	m	
									Cos	de l				
									Net	-				
									i va	inc .				
									Ger	nder				
									Age	- (
												Selec	t Patient	

 $\text{Click} \gg$ to select the highlighted tests for import into G-STAR.

_		List of Tes	ts in Device	Mem	ony		ļ				Select	ed Tests		
No	Hand	Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Tine	Unit	Max	Min. Grip For
L	Left Auto	04-19-2012	16:03:11	lb	101.4		>>	1	Left	04-19	16:03:12	Ь	115.7	
2	Left Auto	04-19-2012	16:03:21	lb	98.2			2	Left	04-19	16:03:21	b	102.2	
3	Left Auto	04-19-2012	16:03:32	lb	95.4			3	Left	04-19	16:03:27	ь	105.4	
	Right Auto	04-19-2012	16:03:16	lb	101.3			1	Right	0+19	16:02:39	Ь	112.3	
	Right Auto	04-19-2012	16:03:27	lb	123.0			2	Right	04-19	15:02:48	b	117.8	
3	Right Auto	04-19-2012	16:03:37	Ib	99.3			3	Right	04-19	16:02:59	b	121.0	
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e la			m			,						Seler	t Patient	
							-							

STEP 2: Selecting the Patient

Click **Select Patient**. The patient can be selected by entering their Code or a combination of Name and Phone number; then click **Search** to display matching results. Highlight the patient to be associated with the stand-alone Selected Tests and then click **OK**.

t												
				Select	Patient							
Code			Name		Phone		Search					
Code	Name	Age	Gender	Handedness	Occupation	Phone						
012010001	Mark Williams Karen John	38 41	Male Female Male	Right Right	Fireman Real Estate Agent	714-786-2943 949-554-1901 714-555-1234						
2012030004	Sam Jones	25	Male	Right	Electrician	714-222-6789						
			1 criticity	rogin	1.000760							
						OK	Carvel					

STEP 3: Saving the Imported Tests

Remarks may be entered for the selected tests prior to saving. Click on **Save to DB** to save the imported tests in the G-STAR database.

		List of Tes	ts in Device	Mem	ony						Select	ed Tests		
w.	Hand	Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Tine	Unit	Max	Min. Grip For
ï	Left Auto	04-19-2012	16:03:11	lb	101.4		>>	1	Left	04-19	16:03:12	ь	115.7	
	Left Auto	04-19-2012	16:03:21	lb	98.2			2	Left	04-19	16:03:21	b	102.2	
	Left Auto	04-19-2012	16:03:32	lb	95.4			3	Left	04-19	16:03:27	ь	105.4	
L	Right Auto	04-19-2012	16:03:16	lb	101.3			1	Right	0+-19	16:02:39	b	112.3	
2	Right Auto	04-19-2012	16:03:27	lb	123.0			2	Right	04-19	15:02:48	ь	117.8	
;	Right Auto	04-19-2012	16:03:37	Ib	99.3			3	Right	04-19	16:02:59	b	121.0	
								4			W			_
											Patient In	formatio	on	
									C	de	2012030004			
									Na	me	Sam Jones			
									G	nder	Male			
									Ag	- [25			
			m	_	_							Seler	t Patient	

As the tests are saved to the database, the list of **Selected Tests** will be cleared and the **Saved** message will be displayed. Click **OK** to continue.

tect f	from USB	_												×
	ĺ	Detecte	ed De	vic	e (H	and Dyn	amoi	net	er)		(de	ar Device M	emory	Close
		List of Tes	ts in Device	Mem	iory						Selec	ted Tests		
No	Hand	Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Tine	Unit	Max	Min. Grip Ford
1	Left Auto	04-19-2012	16:03:11	lb	101.4		>>							
2	Left Auto	04-19-2012	16:03:21	lb	98.2									
3	Left Auto	04-19-2012	16:03:32	lb	96.4									
1	Right Auto	04-19-2012	16:03:16	lb	101.3									
2	Right Auto	04-19-2012	16:03:27	lb	123.0									
3	Right Auto	04-19-2012	16:03:37	Ib	99.3									
						4	Saved OK		Cox Nar Ger	de me nder	Patient 201203000 San Jones Male	Information	on	
e [_			m			,			Age		25	Selev	t Patient	
							Re	marks					5	ave to D6

If Auto Mode tests are also stored in DHD-3 memory, repeat the process to select the Auto Mode Tests for the same patient.

otect	from USB	Detecte	ed De	vic	e (H	and Dyn	amoi	met	er)		(Je	ar Device M	emory	Close
		List of Tes	ts in Device	Merr	ony					_	Selec	ted Tests		
No	Hand	Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Tine	Unit	Max	Min. Grip Force
1	Left Auto	04-19-2012	16:03:11	lb	101.4		>>							
	Left Auto	04-19-2012	16:03:21	b	98.2									
		04-19-2012	16:03:32		95.4		~~							
	Right Auto	04-19-2012	16:03:16		101.3									
	Right Auto	04-19-2012	16:03:27		125.0									
3	Right Auto	04-19-2012	16:03:37	15	99.3									
								1.1			1			
											-	ŀ		
											Patient	Informatio	m	
									Co	de	201203000	4		
									Na	ne	Sam Jones			
									Ge	nder	Male			
									Age		25			
•						,						Selec	t Patient	
							Re	marks -					5	ave to D6

Remarks may be entered for the selected tests prior to saving. Click on **Save to DB** to save the imported tests in the G-STAR database.

	Delect	eu-De	WIC	e (⊓	anu Dyn	amor	nei	er		Clear D	enterne	inor y	0.052
	List of Tee	sts in Devic	e Mem	ony						Selected	Tests		
No Han	d Date	Time	J	Max	Min. Grip Force		No	Hand	Date	Time	Unit	Мак	Min. Grip Ford
						>>	1	Left Auto	04-19	15:03:11	lb	101.4	
							2	Left Auto	04-19	16:03:21	ID IL	98.2	
						<<	3	Right Auto	04-19	16:03:32	ID IN	101.7	
							2	Right Auto	04-19	15:03:27	lb	123.0	
							3	Right Auto	04-19	15:03:37	lb	99.3	
							4			w			
										-1 -1			
										Patient Infe	ormation	i	
								Code	2	012030004			
								Name	s	am Jones			
								Gend	ler N	laic			
								Age	2	5			
<					,						Select	Patient	
						Ren	narks					Se	ve to D6

As the tests are saved to the database, the list of **Selected Tests** will be cleared and the **Saved** message will be displayed. Click **OK** to continue.



After saving the tests, the stored tests in the DHD-3 memory can be cleared by clicking **Clear Device Memory** or by disconnecting the DHD-3 and holding the **Zero** button on the device.

The imported tests can now be displayed in List of Test.



Appendix A: Score Table

The Score Table is used by G-STAR to display the range of normative grip strength force for each hand based on age and gender for the patient during Strength Testing. The lower and upper ranges of normative data are displayed as horizontal red lines.

The Score Table data is based on the following research studies using handle position #2:

Mathiowetz V, Federman S, Wiemer D. "Grip and Pinch Strength: Norms for 6 to 19 Year Olds", *The American Journal of Occupational Therapy* 1986; 40:705-11.

Mathiowetz V, Kashman N, Volland G, Weber K, Dowe M, Rogers S. "Grip and Pinch Strength: Normative Data for Adults", *Archives of Physical Medicine Rehabilitation* Vol. 66, February 1985.

Note Instantion Instantinstantion Instan	Mate boors Left tool Port Ooc Rg/1*0*d Left tool 1 Port Ooc Rg/1*0*d Left tool 1 Port Ooc Rg/1*0*d Left tool 1 1 B 21 1 B 21 1 1 B 23 10 22 27 1 1 B 23 10 24 14 2 1.1 B 23 10 24 14 3 10 B 24 14 14 14 3 10 B 24 127 17 19 3 20 B 71 192 14 14 14 3 20 B 70 120 14 14 14 3 20 B 70 120 14 14 14 14 14 14 14 14 14 14 14 14<			140317	Print Oose
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c } \hline $Mathe boards $$ $$ $$ $$ $$ $$ $$ $$ $$ $$ $$ $$ $$$	tee Hand Dynamometer • Hande Position 2	•		
kpc/wir kpt/wir kpt/wir <t< th=""><th>byte byte <th< th=""><th>Female Scores</th><th></th><th>Male Scores</th><th></th></th<></th></t<>	byte byte <th< th=""><th>Female Scores</th><th></th><th>Male Scores</th><th></th></th<>	Female Scores		Male Scores	
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1 0	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	7 b 20 39 16 36	6 7 B	21 42	18 38
10 11 16 17 16 26 97 11 16 37 78 12 13 5 30 30 32 23 78 12 13 5 6 30 78 12 12 5 5 76 78 12 14 15 5 6 78 44 44 44 10 10 5 70 70 78 78 78 78 44 44 20 10 5 70	1 1 0 15 79 55 71 12 12 15 b 33 16 22 227 14 15 b 40 94 34 14 44 15 b 40 144 44 44 121 16 10 14 14 14 121 121 123 126	9 b 18 55 16 49	8 9 b	27 61	19 63
12 13 16 97<	I I	11 b 37 82 32 59	30 11 b	35 79	26 73
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The following commands are available:

- Modify Enable modification of the Score Table
- Save Save modifications of the Score Table to the database
- **Print** Print an image of the screen to the default printer
- Close Close the screen without saving

DHD-3 Digital Hand Dynamometer

G-STAR[™] Grip Strength Testing and Research Software

Installation and User Manual



973. Yangdeok-dong, MasanHoewon-gu, Changwon 630-728, S. Korea. Phone : +82-55-294-0381 Fax : +82-55-293-5019 Mobile : +82-(0)10-5282-0161 (Att. Tony Kim) E-mail : saehancorp@korea.com, sh@saehanmedical.com Website : www.saehanmedical.com